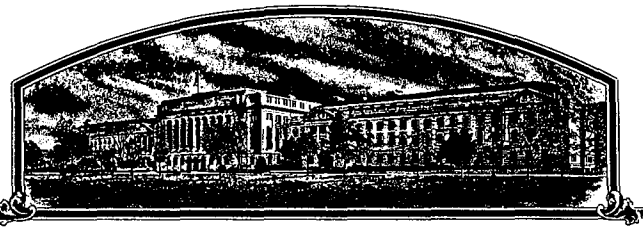
No. 8900312



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHM10'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 31st *day of* October *in the year of our Lord one thousand nine hundred and ninety.*

Attest:

Kenneth R. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Clayton Yeutter

Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION

3. VARIETY NAME
PHM10

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
Plant Breeding Division
Department of Corn Breeding
PO Box 85
Johnston, IA 50131-0085

5. PHONE *(Include area code)*
515/270-3300

FOR OFFICIAL USE ONLY

PVPO NUMBER
8900312

6. GENUS AND SPECIES NAME
Zea mays

7. FAMILY NAME *(Botanical)*
Gramineae

FILING
DATE
Sept. 28 1989
TIME
2:00 ☐ A.M. ☑ P.M.

8. KIND NAME
Corn

9. DATE OF DETERMINATION
1986

FEES RECEIVED
AMOUNT FOR FILING
$ 1800.00 + 350.00
DATE
Sept. 28, 1989, Oct. 10, 19
AMOUNT FOR CERTIFICATE
$ 250.00
DATE
October 12, 1990

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Iowa

12. DATE OF INCORPORATION
May 6, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Richard L. McConnell
Plant Breeding Division
Pioneer Hi-Bred International, Inc.
PO Box 85
Johnston, IA 50131-0085
PHONE *(Include area code)*: 515/270-3363

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
Pioneer Hi-Bred International, Inc.

DATE

SIGNATURE OF APPLICANT
Richard L McConnell

DATE
9-22-89

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

14A. Exhibit A. Origin and Breeding History

Pedigree: G39/207)X53331X

Pioneer line PHM10, Zea mays L., a yellow dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross G39 x 207 using the pedigree method of breeding. The progenitors of PHM10 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for seven generations in the development of PHM10 at Mankato, Minnesota. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Mankato, Minnesota, as well as other Pioneer research stations in the northern maturity areas of the U.S. Corn Belt. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

PHM10 has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHM10.

Developmental History for PHM10

Season/Year	Inbreeding Level
Summer 1978	F0 (Cross made)
Summer 1979	F1
Summer 1980	F2
Summer 1981	F3
Summer 1982	F4
Summer 1983	F5
Summer 1984	F6
Summer 1985	F7
Summer 1986	F8*
Summer 1987	F9**

* Through F8 generation, PHM10 was selfed and selected.

** PHM10 was selfed and ear-rowed in F9 generation.

EXHIBIT B. Novelty Statement.

PHM10 is most similar to the Pioneer Hi-Bred International, Inc. proprietary inbred line 207 (PVP Certificate No. 8300144). The leaf color of PHM10 is medium green whereas 207's leaf color is dark green. PHM10 has 7 tassel branches, green-yellow anthers, and green glumes whereas 207 has 15 tassel branches, red anthers, and red glumes. The silk color of PHM10 is green-yellow compared to red for 207.

The data in Exhibit D shows PHM10 yields more and has higher test weight and grain harvest moisture than 207. PHM10 has higher ear placement than 207. PHM10 flowers (GDU SHD and GDU SLK) later than 207. Stay green and stalk lodging is significantly better for PHM10 than 207.

VARIETY DESCRIPTION INFORMATION

Type: Dent Region Best Adapted: North

A. Maturity: Average of northern maturity zones. Zone : 2

INBRED = PHM10
Heat Unit Shed: 1430
Heat Unit Silk: 1460
No. Reps: 33

$$\text{HEAT UNITS} = \frac{[\text{Max.Temp. } (\leq 86°\text{F.}) + \text{Min. Temp } (\geq 50°\text{F.})]^*}{2} - 50$$

* If maximum is greater than 86 degrees fahrenheit, then 86 is used and if minimum is less than 50, then 50 is used. Heat units accumulated daily and can not be less than 0.

B. Plant Characteristics:

Plant height (to tassel tip): 220 cm
Length of top ear internode: 12 cm
Number of ears per stalk: single
Ear height (to base of top ear): 84 cm
Number of tillers: None
Cytoplasm type: Normal

C. Leaf:

Color: (WF9) Medium green
Angle from Stalk: 30 - 60 degrees
Marginal Waves: (WF9) Few
Number of Leaves (mature plants): 18
Sheath Pubescence: (W22) Light
Longitudinal Creases: (OH65A) Few
Length (Ear node leaf): 68 cm
Width (widest point, ear node leaf): 8 cm

D. Tassel:

Number lateral branches: 7
Branch Angle from central spike: > 45 degrees
Pollen Shed: Light based on pollen Yield Test (77% of experiment mean).
Peduncle Length (top leaf to basal branches): 20 cm
JMS 9/20/90 Anther Color: Greenish-yellow 5GY 7/12, Munsell Book of Color
Glume Color: Green

E. Ear (Husked Ear Data Except When Stated Otherwise):

Length: 19 cm
Weight: 127 gm
Mid-point Diameter: 41 mm
JMS 9/20/90 Silk Color: Greenish-yellow 5GY 7/12, Munsell Book of Color
Husk Extension (Harvest stage): Medium (barely covering ear)
Husk Leaf: Long (> 15cm)
Taper of Ear: Slight taper
Position of Shank (dry husks): Horizontal
Kernel Rows: Straight, Distinct, Number = 16
Husk Color (fresh): Light green
Husk Color (dry): Buff
Shank Length: 15 cm
Shank (No. of internodes): 8

F. Kernel (Dried):

Size (from ear mid-point)
Length: 10 mm
Width: 8 mm
Thick: 5 mm
Shape Grade (% rounds): 40 - 60 medium rounds based on Parent Test data.
Pericarp Color: Colorless
Aleurone Color: Homozygous Yellow
Endosperm Color: Yellow
Endosperm Type: Normal
Gm Wt/100 Seeds (unsized): 24 gm

G. Cob:

Diameter at mid-point: 26 mm
Strength: Strong
JMS 9/20/90 Color: Red~~dish pink~~

H. Diseases:

Corn Lethal Necrosis (MCMV=Maize Chlorotic Mottle Virus and MDMV=Maize Dwarf Mosaic Virus): Intermediate
Anthracnose Stalk Rot (C. Graminicola): Intermediate
N. Leaf Blight (H. Turcicum): Intermediate
Carbonum Leaf Blight (H. Carbonum): Intermediate
Common Rust (P. Sorghi): Resistant
Eye Spot (K. Zeae): Intermediate
Gray Leaf Spot (C. Zeae): Susceptible
Stewarts Wilt (E. Stewartii): Intermediate
Goss's Wilt (C. Nebraskense): Intermediate
Common Smut (U. Maydis): Intermediate
Head Smut (S. Reiliana): Resistant
Downy Mildew (S. Sorghi): Resistant
Fusarium Ear Mold (F. Moniliforme): Susceptible

I. Insects:

European Corn Borer-1 Leaf Damage (Pre-flowering): Intermediate
European Corn Borer-2 (Post-flowering): Susceptible

J. Variety Most Closely Resembling:

Character	Inbred
Maturity	207
Plant Type	207
Ear Type	G39
Kernel Type	G39
Usage	207

G39 (PVP Certificate No. 8300115) and 207 (PVP Certificate No. 8300144) are Pioneer Hi-Bred International, Inc. proprietary inbreds.

Data for items B, C, D, E, F, and G are based primarily on a maximum of three reps of data from Johnston, Iowa grown in 1987 and 1988, plus description information from the maintaining station.

EXHIBIT D. ADDITIONAL DESCRIPTION OF PHM10.

INBRED PER SE YIELD TEST COMPARISON OF PHM10 AND 207 EVALUATED OVER THREE YEARS.

VARIETY #1 - PHM10
VARIETY #2 - 207

* = 10% SIG + = 5% SIG # = 1% SIG

YEAR	VAR #	BU ACR ABS	BU ACR %MN	MST ABS	BAR PLT ABS	PLT HT ABS	EAR HT ABS	SDG VGR ABS	EST CNT ABS	DRP EAR ABS	GDU SHD ABS	GDU SLK ABS	TST WTA ABS	GRN QUL ABS	STA GRN ABS	STK LDG ABS	RT LDG ABS	BRT STK ABS
87	1	67.0	93	18.8	97.0	201.9	79.2	6.1	37.7	99.5	1403	1458	57.6	5.6	5.2	96.1	92.9	
	2	61.3	91	17.3	99.6	185.7	80.0	5.1	34.8	99.7	1349	1418	56.4	4.2	3.8	91.0	100.0	
	LOCS	13	13	15	10	12	12	15	45	11	26	23	13	12	13	12	1	
	PROB	.245	.780	.003#	.025+	.000#	.761	.015+	.000#	.641	.000#	.002#	.036+	.004#	.001#	.079*		
88	1	49.1	94	19.4	82.8	175.3	67.8	5.9	45.7	99.5	1456	1495	56.0	5.4	4.0	98.2	94.1	98.9
	2	46.5	87	18.1	89.4	156.5	61.7	5.5	42.8	99.5	1361	1420	55.1	4.6	2.9	95.7	99.1	100.0
	LOCS	25	25	26	12	18	18	23	38	13	32	26	25	18	11	14	9	1
	PROB	.407	.314	.002#	.070*	.000#	.002#	.230	.000#	.714	.000#	.000#	.020+	.017+	.045+	.175	.138	
89	1	90.7	111	23.0	94.0	216.4	82.3	5.2	42.4	99.6	1413	1406	56.2	5.9	5.3	97.0	86.9	
	2	76.5	95	19.8	100.0	201.4	77.5	5.5	41.8	99.3	1297	1326	55.0	5.4	3.4	92.3	98.9	
	LOCS	12	12	12	2	13	12	14	23	7	17	10	12	10	6	6	4	
	PROB	.000#	.000#	.002#	.500	.001#	.026+	.427	.560	.470	.000#	.000#	.000#	.249	.002#	.033+	.391	
TOTAL SUM	1	63.7	98	20.1	89.7	195.1	75.2	5.7	41.6	99.5	1428	1466	56.5	5.6	4.8	97.2	91.9	98.9
	2	57.5	90	18.2	94.5	178.3	71.6	5.4	39.2	99.5	1342	1403	55.4	4.7	3.4	93.3	99.1	100.0
	LOCS	50	50	53	24	43	42	52	106	31	75	59	50	40	30	32	14	1
	DIFF	6.2	8	1.8	4.9	16.8	3.6	0.4	2.4	0.0	86	63	1.1	0.9	1.4	3.9	7.2	1.1
	PROB	.006#	.054*	.000#	.010+	.000#	.004#	.063*	.000#	.827	.000#	.000#	.000#	.000#	.000#	.004#	.077*	

YEAR	VAR #	BU ACR ABS	BU ACR %MN	MST ABS	BAR PLT ABS	PLT HT ABS	EAR HT ABS	SDG VGR ABS	EST CNT ABS	DRP EAR ABS	GDU SHD ABS	GDU SLK ABS	TST WTA ABS	GRN QUL ABS	STA GRN ABS	STK LDG ABS	RT LDG ABS	BRT STK ABS

8700 312

DEFINITIONS

In the description and examples, a number of terms are used herein. In order to provide a clear and consistent understanding of the specification and claims, including the scope to be given such terms, the following definitions are provided:

BAR PLT = BARREN PLANTS. This is the percent of plants per plot that were not barren (lack ears).

BRT STK = BRITTLE STALKS. This is a measure of the stalk breakage near the time of pollination, and is an indication of whether a hybrid or inbred would snap or break near the time of flowering under severe winds. Data are presented as percentage of plants that did not snap.

BU ACR = YIELD (BUSHELS/ACRE). Actual yield of the grain at harvest adjusted to 15.5% moisture. ABS is in absolute terms and % MN is percent of the mean for the experiments in which the hybrid or inbred was grown.

DRP EAR = DROPPED EARS. This is a measure of the number of dropped ears per plot and represents the percentage of plants that did not drop ears prior to harvest.

EAR HT = EAR HEIGHT. The ear height is a measure from the ground to the top developed ear node attachment and is measured in centimeters.

EST CNT = EARLY STAND COUNT. This is a measure of the stand establishment in the spring and represents the number of plants that emerge on a per plot basis for the hybrid or inbred.

GDU SHD = GDU TO SHED. The number of growing degree units (GDUs) or heat units required for an inbred line or hybrid to have approximately 50 percent of the plants shedding pollen and is measured from the time of planting. Growing degree units are calculated by the Barger Method, where the heat units for a 24-hour period are:

$$GDU = \frac{(\text{Max. temp.} + \text{Min. temp.})}{2} - 50$$

The highest maximum temperature used is 86°F and the lowest minimum temperature used is 50°F. For each inbred or hybrid it takes a certain number of GDUs to reach various stages of plant development.

GDU SLK = GDU TO SILK. The number of growing degree units required for an inbred line or hybrid to have approximately 50 percent of the plants with silk emergence from time of planting. Growing degree units are calculated by the Barger Method as given in GDU SHD definition.

GRN QUL = QUAL. = GRAIN QUALITY. This is a 1 to 9 rating for the general quality of the shelled grain as it is harvested based on such factors as the color of the harvested grain, any mold on the grain, and any cracked grain. High scores indicate good grain quality and low scores indicate poor grain quality.

MST = HARVEST MOISTURE. The moisture is the actual percentage moisture of the grain at harvest.

PLT HT = PLANT HEIGHT. This is a measure of the height of the plant from the ground to the tip of the tassel in centimeters.

RT LDG = ROOT LODGING. Root lodging is the percentage of plants that do not root lodge; plants that lean from the vertical axis at an approximately 30° angle or greater would be counted as root lodged.

SDG VGR = SEEDLING VIGOR. This is the visual rating (1 to 9) of the amount of vegetative growth after emergence at the seedling stage (approximately five leaves). A higher score indicates better vigor and a low score indicates poorer vigor.

STA GRN = STAY GREEN. Stay green is the measure of plant health near the time of black layer formation (physiological maturity). A high score indicates better late-season plant health.

STK LDG = STALK LODGING. This is the percentage of plants that did not stalk lodge (stalk breakage) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break below the ear.

TST WT = TEST WEIGHT UNADJUSTED. The measure of weight of the grain in pounds for a given volume (bushel).

14E. Exhibit E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of PHM10. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHM10.